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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/480,223	01/10/2000	SEAMUS PAUL WHISTON	G0631/7010	4079

7590 12/23/2003
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EXAMINER

HUYNH, YENNHU B

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/480,223

Applicant(s)

WHISTON ET AL:

Examiner

Yennhu B Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

This Office Action is in response to the Interview Summary on 5/2/03.

Per Applicant request the last Final Rejection withdrawn.

Election/Restrictions

Claims 16-27 have been cancelled in Amendment filed on 8/27/01.

Information Disclosure Statement

The information disclosure statement is being considered by the examiner.

Oath/Declaration

Oath/Declaration filed on 01/10/00 Is accepted.

Specification

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 1 recites the limitation --steps (a) and (b)-- in line 10, should be changed to:

--wherein the steps (a) and (b)- - .

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 & 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hshieh (U.S. 4,931,408) in view of Ohzone et al. (IEEE, Vol. 42, N.1, 1/1995) .

-Re. claims 1-3, & 8-13 Hshieh at figs. 1-11 in related art col. 1-6 disclose a method of forming a DMOS transistor, which includes forming a conductive gate 48 over gate oxide 46; forming a body region 44/64 in a drain region, after formed the gates, by an ion implantation 65 to have the desired breakdown voltage (col.4, lines 5-13), extending beneath the gate (fig. 9, 10), and align with the gate where the gate act as a mask; dopant boron or phosphorous implanted in the drain region is diffused into the body region; (col.3 & 4 lines 15-).

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However, Hshieh does not teach two implanting for forming the body region by two angle implantation process and at the same / different dose and/or energy.

Ohzone et al. at figs. 1-9 in related text pages 70-77 disclose electrical characteristics of scaled CMOSFET's with LDD region and source/drain regions fabrication, which include two implantations at different angle implanted into drain region to form P/N body region. The two implantation are performed at a ranging from 7- 10 degrees and at 0 degrees phosphorous /boron implantation, wherein the 7 degrees tilt angle four times rotating implantation at the dose and energy is optimized (Abstract, p. 70-72, figs. 1 & 9a, 9b).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Hshieh invention by incorporation two implantations performed into drain region to form a body region, to eliminate the shadow effect by the gate electrode, improve the asymmetrical impurity profiles, and have a desired drain/source threshold voltage or breakdown threshold voltage.

Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hshieh (U.S. 4,931,408) in view of Ohzone et al. (IEEE, Vol. 42, N.1, 1/1995) and Harada et al. (U.S. 6,426,258B1).

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Hshieh and Ohzone et al. disclose substantially all of the claimed invention, but do not disclose the range of implantation angles to the surface plane of the drain region is from about between 30 – 90 degrees.

Harada et al. disclose a method of manufacturing integrated circuit device relates to a DMOS FET, which include the range of implantation angles to the surface plane of the drain region is between 30 – 60 degrees or more (col.9 & 10 lines 60-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Hshieh and Ohzone et al. invention by incorporation the range of implantation angles to the surface plane of the drain region is between 30 – 60 degrees or more , to obtain impurities are implanted by such degrees in the desired region in order to prevent a channeling phenomenon.

Claims 14 & 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hshieh in view of Ohzone and Contiero et.al. (Cited in Background of The Invention).

Hshieh and Han teach all substantially of the claimed invention except where the forming the body region in the drain region of the DMOS device is a LDMOS and relates to CMOS.

Contiero as set forth at pages 1-3 of the specification disclose a method for integrating a self aligned DMOS device, which includes the implantation into

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the drain region to form a body region and relates LDMOS to a CMOS and DMOS process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Hshieh and Ohzone et al. invention by incorporation of forming of an LDMOS device related to a CMOS process, to control the threshold breakdown voltage as desired.

Response to Arguments

Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B Huynh whose telephone number is 703-308-6110 (and the new telephone number will be effected from 2/5/04). The examiner can normally be reached on 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-7724.

Yennhu Huynh
Examiner
121703

A handwritten signature in black ink, appearing to be 'YH' or similar, written over a horizontal line.